

Name : Khurram Imtiaz

Student ID : 16435

Department: DPT (2nd)

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Teacher's Name : Dr. Shahzaib

Mid-Term Assignment

Course Title: **Biomechanics And Ergonomics I**

DPT 2nd semester section B

Instructor: Dr. M .Shahzeb khan (PT)

Marks: 30

Note:

- **Attempt all questions, all questions carry equal marks.**
- **Answer Briefly and to the point, avoid un-necessary details**

Q1: (A) What is biomechanics and ergonomics?

Ans: Biomechanics:

The mechanics of biological and specially muscular activity (as in locomotion are exercise). The scientific study role of mechanics in biological system. At any level from whole organisms to organs.

Ergonomics:

The scientific study of people and their working conditions, especially done in order to improve effectiveness. The science that seeks to adapt work or working conditions to their worker.

Q:1 (B)

Why we study biomechanics and ergonomics in physical therapy:

Ans: Biomechanical methods are used in our rehabilitation research to quantify movement. In addition to quantify movement , biomechanical method contribute to a comprehensive approach to understanding the effect of rehabilitation .

Those dysfunction that result after injury or impede optimal clinical outcomes during rehabilitation.

In ergonomics physical therapist have extensive education and experience evaluating the mechanical forces at work in human body. Injuries occur when biomechanically forces exceed the biomechanical limitation of soft tissue or bone.

Q:2 what is shoulder complex? Elaborate it

Ans :The shoulder complex , composed of the clavicle, scapula, and humerus, is an intricately designed combination of three joints that links the upper extremity to thorax. Shoulder complex consist of three joints:

- Sternoclavicular joint
- Acromioclavicular joint
- Glenohumeral joint

1. **Sternoclavicular joint :**

Joints between medial end of clavicle and superolateral aspect of manubrium. links the upper extremity directly to thorax.

2. **Acromioclavicular joint :**

Joint between lateral end of clavicle and acromion of scapula.it is a synovial joint and articular disc present.

3. **Glenohumeral joint:**

Joint between glenoid fossa of scapula and head of humerus. Ball and socket joint, glenoid fossa faces slight anteriorly.

B) what makes shoulder joint most mobile?

The human shoulder is the most mobile joint in the body. The mobility provides the upper extremity with tremendous range of motion such as adduction, abduction, flexion, abduction, extension, internal and external rotation. Its involves articulation between the glenoid cavity of scapula and the head of humerus. Due to very loose joint capsule that gives a limited interface of the humerus and scapula, it is the most mobile joint in the body

C) How normal position of scapula and humerus aid in stability of shoulder joint ?

The rotator cuff muscle of the shoulder produce a high tensile force, and help to pull the head of humerus into glenoid cavity. The glenoid cavity is shallow and contain the glenoid labrum which deepens it and aids in stability. Rotator cuff is a group of four muscles that surrounds the shoulder stability. The muscle of rotator cuff are supraspinatus, subscapularis, infraspinatus,and teres minor.

D) what is osteo and arthrokinematics? Explain it with example.

Osteokinematics: gross movements of bones at joint...

We use osteokinematics terms, such as abduction, flexion or extension, to name the movements that occur between bones at synovial joints.

If the joint is fixed at one point, as if the center of rotation is stationary like an automobile axes, location are fairly. It describe clear movement of bone which are visible from the **outside. Example:** lateral rotation and medial rotation

Orthrokinematics: refers to the movement of joint surfaces.

The angular movement of bones in the human body occur as a result of a combination of rolls , spins and slides.

Example:

Glenohumeral articulation :

Concave glenoid fossa articulate with the convex humeral head. Glenohumeral posterior glide increase flexion and internal rotation. Glenohumeral anterior glide increase extension and external rotation.

Q:3 how supraspinatus muscle different from other SITS muscle in Gh stabilization?

The supraspinatus muscle performs abduction of the arm, and pulls the head of the the humerus medially towards the glenoid cavity. The supraspinatus works in cooperation with the deltoid muscle to perform adduction,, including when the arm in adducted position. They also referred to the as the SITS, with reference to the first letter of their names. The muscles arise from the scapula and connects to the head of the humerus, forming a cuff around the glenohumral joint.

B) explain how scapula movement is necessary for normal range of motion of shoulder joint?

In normal upper quarter function, the scapula provides a stable base from which glenohumral mobility occurs. The scapular muscles must dynamically position the glenoid so that efficient glenohumral movement occur. This interaction is important for the optimal function of the shoulder. When there is the change of the normal position of the scapula in relation to the humerus, this can cause a disfunction of scapulohumeral rhythm. The change of normal position of the scapular dyskinesia. The scapula commonly referred to as the shoulder blade, is the bone that SITS above the rib cage in the upper back. It creates the shoulder joint where it meets with the head of humerus, the bone of the the arm. The scapula can move in six direction and each movement is produce by specific, primary muscles.